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intensities (column five) of the lines is practicable, since the observations were made with spectrographs which differ widely in their transmission for different parts of the spectrum. Again, there is a strong suspicion that the bright-line spectrum of the corona is variable, tho experience in dealing with spectrograms taken under a variety of conditions and with a variety of instruments teaches one to be guarded in making such statements. In this connection, a few striking differences should be noted. The line at 3601A, unmistakably coronal and strong in 1908 and 1918, was not observed in earlier years by Hills and Newall, Dyson, etc., tho their quartz spectrographs were certainly well adapted to recording it if it actually existed at those eclipses. The line at 4359A was observed in the years 1898-1905 in good strength but was invisible in 1908 and 1918. The line 4087A was strong on Lewis's spectrogram of 1908, but weak on all other spectrograms. The questions of variability and the relations of relative intensities to the sun-spot period are interesting ones for future decision.

On our spectrogram the lines 3601 and 5303A seem to have the same form: strong at the Sun's edge, and gradually decreasing in strength toward their outer ends. Jewell reported for the 1901 eclipse that the coronal rings 3381 and 5303A, as photographed with a slitless spectrograph, had identical forms; and that the rings at 3456, 3643, 3801, and 3987A had a common but different form. We find that the line 4231A is long and of slowly diminishing intensity as it proceeds outward from the Sun's edge, thus indicating a stratum source quite different from the 3381, 3601 and 5303A strata. The distribution of the 4231A materials around the Sun seems to be more uniform than that of the 5303A materials.

Three bright lines whose positions we have determined as 3648.0, 4244.8, and 4533.4A, and which we suspect of being coronal lines, do not appear to have been observed on previous spectrograms.

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EIGHT STARS WITH VARIABLE RADIAL VELOCITIES

The following stars have been found to have variable radial velocities, from recent measures of spectrograms secured with the three-prism Mills' spectrograph of the Lick Observatory. The spectra of both components are visible in several cases.

64 *Piscium* ($\alpha = 0^h 43^m.7$; $\delta = +16^\circ 24'$; Mag. = 5.2; Class F)

Both spectra are visible, the two components being of about the same intensity. On two of the three spectrograms the separation of the double lines corresponds to a relative velocity for the two components of 90 km./sec. The lines on the third plate are hardly resolved. The spectrum contains fairly good lines.

σ *Piscium* ($\alpha = 0^h 57^m.3$; $\delta = +31^\circ 16'$; Mag. = 5.5; Class B 9)

The spectral lines are good for this class of spectrum. The spectra of both components are visible but of slightly unequal intensities. On the first spectrogram 4481A is double, and the components correspond respectively to radial velocities of -55 and $+74$ km./sec. The second plate secured five days later shows 4481A and 4549A single, with velocity of $+8$ km./sec.

κ *Aretis* ($\alpha = 2^h 1^m.0$; $\delta = +22^\circ 11'$; Mag. = 5.1; Class A)

Seven spectrograms of this star were obtained during September and November, 1918. On three of them the components of the two spectra are well separated, but the others were taken at times of coincidence of the two spectra. The two components appear to differ slightly in intensity. The observations are well satisfied by a period of 3.08 days, and they yield preliminary values of the velocity of the system and of the eccentricity, $+9$ km./sec. and 0.24 respectively. The maximum separation of the lines corresponds to a relative velocity of 80 km./sec. Observations will be secured later for a definitive orbit. The quality of the spectrum is good.

f *Persei* ($\alpha = 4^h 8^m.1$; $\delta = +40^\circ 14'$; Mag. = 4.9; Class F)

Six spectrograms, three in 1907 and one each in 1908, 1917 and 1918, show a progressive change in the radial velocity from $+17$ to -16 km./sec. The spectral lines are of good quality for measurement.

66 *Eridani* ($\alpha = 5^h 1^m.8$; $\delta = -4^\circ 47'$; Mag. = 5.2; Class A)

Thirteen spectrograms taken in the interval from October 22 to November 8, 1918 show both single and composite spectra, with one component a little stronger than the other. The maximum separation of the double lines corresponds to a relative velocity of 215 km./sec. A provisional orbit for the stronger component has determined the period to be 5.5 days and the velocity of the system $+31$ km./sec.

More observations will be secured later for a definitive orbit. A faint third component line, frequently visible between the two strong components referred to above, does not partake of their change in position.

The lines are of sufficiently good quality to permit of fairly accurate measurement.

ϕ 2 Hydrae ($\alpha = 10^h 33^m.7$; $\delta = -16^\circ 22'$; Mag. = 5.1; Class K)

A number of spectrograms of this star have been obtained here and at Santiago, Chile, in the years 1912-1918. A change in radial velocity from +23 to +13 km./sec. is shown by the measures.

ξ 53 Ursae Majoris, fainter star, ($\alpha = 11^h 12^m.9$; $\delta = +32^\circ 6'$; Mag. = 4.9; Class G)

The brighter component of this visual double star is known to be a spectroscopic binary with a period of 1.80 years. The spectrograms of the fainter component show a variation in radial velocity from -6 to -18 km./sec.

ι 45 Herculis ($\alpha = 16^h 42^m.8$; $\delta = +5^\circ 25'$; Mag. = 5.3; Class A p)

Five spectrograms taken in the interval 1913-1918 give a variation in radial velocity from -10 to -19 km./sec.

The spectral lines are of good quality.

We have found on spectrograms of nine other stars evidence of doubling of the lines. In several of these cases, only one spectrogram has been secured and announcement of the binary character is held for the confirmation by later observations.

The spectrograms from which the above conclusions have been drawn were exposed by various members of the staff, but for the most part by Messrs. Moore, Paddock and Thiele; the spectrograms have been measured chiefly by Miss Hobe; and the data have been prepared for publication by Mr. Thiele.

W. W. CAMPBELL.

THE LICK OBSERVATORY COMMUNITY IN WAR SERVICE

The views of the Observatory community as to the unpardonable starting of an inexcusable war by two irresponsible governments, and as to the methods, purposes and consequences of Prussian militarism may safely be inferred from the following statements:

Every male graduate of the little grammar school on Mount Hamilton who is old enough for war service volunteered for war